Electronic Version

Stylesheet Version v1.1.1

Claims

[c1] 1. A method of expanding an redundant array of independent disks (RAID), wherein the RAID comprises M number of storage devices, and each of the storage devices comprises N number of storage blocks, which are defined as:

$D_{I,J}$: the J^{th} data block of the I^{th} storage device;

$P_{I,J}$: the J^{th} data block of the I^{th} storage device, being a parity data block;

wherein, I is a positive integer of 1 ~ M, J is a positive integer of 1 ~ N, and the arrangement order of the storage devices is: if $D_{I,J} = P_{I,J}$, then $D_{I-1,J+1} = P_{I-1,J+1}$, the method comprising:

providing an expansive storage device;

disposing the expansive storage device in front of the storage devices, wherein the Y^{th} data block of the expansive storage device is represented as $D_{0,Y}$; and

sequentially moving the $D_{I,J}$ data blocks except $P_{I,J}$, wherein Y is a positive integer of 1 ~ N, and if $D_{X,Y} = P_{X,Y}$, then $D_{X-1,Y+1} = P_{X-1,Y+1}$, and wherein X is a positive integer of 0 ~ M.

[c2] 2. The method of expanding RAID of claim 1, wherein

the step of sequentially moving $D_{I,J}$ further comprises sequentially moving $D_{I,J}$ in an ascending order based on the sequence of an I value.

[c3] 3. The method of expanding RAID of claim 1, wherein the step of sequentially moving $D_{I,J}$ further comprises sequentially moving $D_{I,J}$ in an ascending order based on the sequence of a J value.

[c4] 4. A method of expanding an redundant array of independent disks (RAID), wherein the RAID comprises M number of storage devices, and each of the storage devices comprises N number of storage blocks, which are defined as:
$D_{I,J}$: the J^{th} data block of the I^{th} storage device;
$P_{I,J}$: the J^{th} data block of the I^{th} storage device, being a parity data block;
wherein, I is a positive integer of 1 ~ M, J is a positive integer of 1 ~ N, and a same J^{th} data block in the storage devices comprises at least a parity data block, the method comprising:
providing an expansive storage device;
disposing the expansive storage device in front of the storage devices, and the Y^{th} data block of the expansive storage device is represented as $D_{0,Y}$; and
sequentially moving the $D_{I,J}$ data blocks except $P_{I,J}$,
wherein Y is a positive integer of 1 ~ N, and the positions

of the parity data block of the same J^{th} data block in the storage devices are the same.

[c5] 5. The method of expanding RAID of claim 4, wherein the step of sequentially moving $D_{I,J}$ further comprises sequentially moving $D_{I,J}$ in an ascending order based on the sequence of an I value.

[c6] 6. The method of expanding RAID of claim 4, wherein the step of sequentially moving $D_{I,J}$ further comprises sequentially moving $D_{I,J}$ in an ascending order based on the sequence of a J value.